BRUHATH BANGALORE MAHANAGARA PALIKE

Name of the Agency	:	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of the Work	:	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Estimate Cost	:	Rs.

QUALITY CONTROL REPORTS TO

Asst. Executive Engineer,
Shettyhalli Sub Division,
BBMP, Bangalore.

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QUALITY CONTROL REPORTS

WET MIX MACADAM (WMM)

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Job No.: CTCE/BBMP/W.No.13/GNR/WMM/Gradation/2015-16

17.02.2016

GRADATION FOR WMM

MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

Agency : **Mr. G.N. Ramesh,**
No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.

Name of Work : Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.

Reference : EE/DD/WO.366/2014-15 Dated: 31.03.2015

Date of Testing : 17.02.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8105**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	130	130	1.6	98.4	95-100
22.4	2615	2745	33.9	66.1	60-80
11.2	1180	3925	48.4	51.6	40-60
4.75	1120	5045	62.2	37.8	25-40
2.36	990	6035	74.5	25.5	15-30
0.600	890	6925	85.4	14.6	8-22
0.075	800	7725	95.3	4.7	0-8

Note:

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Job No.: CTCE/BBMP/W.No.13/GNR/WMM/Gradation/2015-16

17.02.2016

GRADATION FOR WMM

MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

Agency : **Mr. G.N. Ramesh,**
No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.

Name of Work : Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.

Reference : EE/DD/WO.366/2014-15 Dated: 31.03.2015

Date of Testing : 17.02.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8630**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	295	295	3.4	96.6	95-100
22.4	2480	2775	32.2	67.8	60-80
11.2	1310	4085	47.3	52.7	40-60
4.75	1215	5300	61.4	38.6	25-40
2.36	1050	6350	73.6	26.4	15-30
0.600	935	7285	84.4	15.6	8-22
0.075	795	8080	93.6	6.4	0-8

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Job No.: CTCE/BBMP/W.No.13/GNR/WMM/Gradation/2015-16

17.02.2016

GRADATION FOR WMM

MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

Agency : **Mr. G.N. Ramesh,**
No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.

Name of Work : Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.

Reference : EE/DD/WO.366/2014-15 Dated: 31.03.2015

Date of Testing : 17.02.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8285**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	260	260	3.1	96.9	95-100
22.4	2350	2610	31.5	68.5	60-80
11.2	1285	3895	47.0	53.0	40-60
4.75	1205	5100	61.6	38.4	25-40
2.36	1005	6105	73.7	26.3	15-30
0.600	985	7090	85.6	14.4	8-22
0.075	795	7885	95.2	4.8	0-8

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Job No.: CTCE/BBMP/W.No.13/GNR/WMM/Gradation/2015-16

17.02.2016

GRADATION FOR WMM

MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

Agency : **Mr. G.N. Ramesh,**
No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.

Name of Work : Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.

Reference : EE/DD/WO.366/2014-15 Dated: 31.03.2015

Date of Testing : 17.02.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **7930**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	215	215	2.7	97.3	95-100
22.4	2480	2695	34.0	66.0	60-80
11.2	1185	3880	48.9	51.1	40-60
4.75	1050	4930	62.2	37.8	25-40
2.36	980	5910	74.5	25.5	15-30
0.600	960	6870	86.6	13.4	8-22
0.075	810	7680	96.8	3.2	0-8

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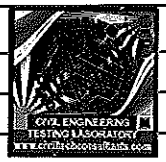
Job No.: CTCE/BBMP/W.No.13/GNR/WMM/AIV/2015-16 18.02.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of the Work	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	18.02.2016



Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	392	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	307	
4	Aggregate Impact value = percent fines	22.62	21.68	
	100* (W_2/W_1)%			22.15

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.13/GNR/WMM/AIV/2015-16 18.02.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of the Work	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	18.02.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	304	
4	Aggregate Impact value = percent fines	21.82	21.24	
	100* (W_2/W_1)%			21.53

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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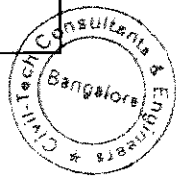
Job No.: CTCE/BBMP/W.No.13/GNR/WMM/S-T/2015-16 18.02.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of Work	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	18.02.2016



Result : Flakiness Index = **11.85%**

Elongation Index = **13.20%**

Result : Combined Flakiness & Elongation index **25.05%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.13/GNR/WMM/S-T/2015-16 18.02.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of Work	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	18.02.2016

Result : Flakiness Index = **11.05%**

Elongation Index = **13.10%**

Result : Combined Flakiness & Elongation index **24.15%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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T-2377

Job No.: CTCE/BBMP/W.No.13/GNR/CSR-02/1075c/Pre Cast Slab/2015-16 20.02.2016

TEST REPORT ON CONCRETE CORE (PRE CAST SLAB)

* Name of Customer	:	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
* Name of Agency	:	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
* Name of work	:	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	:	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Techinical Reference	:	IS:516-1959 (Reaffirmed 2008), SP-24:1983.
Sample ID	:	Pre cast slab
Sample Received on	:	18.02.2016
Date of Testing	:	20.02.2016

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	78.00	0.386	2520.36	1.56	0.960	32.00	16.30	17.60	16.90	21.12
2	50.00	83.00	0.413	2534.21	1.66	0.970	32.50	16.55	17.88	17.34	21.67
3	50.00	80.00	0.397	2527.38	1.60	0.965	33.60	17.11	18.48	17.83	22.29

* Information is furnished by the Customer/Representative

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VISHWANATH .G
Quality Manager

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

QUALITY CONTROL REPORTS FOR

BITUMINOUS CONCRETE

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

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T-2377

Job No.: CTCE/BBMP/W.No.13/GNR/CSR-02/1075c/QB(BC)/2015-16 15.03.2016

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
*NAME OF THE WORK	:	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	:	EE/DD/WO.366/2014-15 Dated: 31.03.2015
*SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	12.03.2016
DATE OF TESTING	:	15.03.2016

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	62	60 to 70
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	46	Min. 45
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 50
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	302	Min. 220

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VISHWANATH .C
Quality Manager

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
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Job No.: CTCE/BBMP/W.No.13/GNR/BC/AIV/2015-16 15.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of the Work	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	15.03.2016

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	375	376	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	75	76	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	20.00	20.21	**20.11**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.13/GNR/BC/AIV/2015-16 15.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
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Reference	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	15.03.2016

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	381	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines			
	100* (W_2/W_1) percent	21.05	21.26	**21.16**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.13/GNR/BC/AIV/2015-16 15.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of the Work	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	15.03.2016

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	79	80	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	20.84	21.05	**20.95**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

Note:

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Job No.: CTCE/BBMP/W.No.13/GNR/BC/Shape.T/2015-16 : 15.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of Work	: Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	: EE/DD/WO.366/2014-15 Dated: 31.03.2015
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 15.03.2016

Result : Flakiness Index = **11.06%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **24.31%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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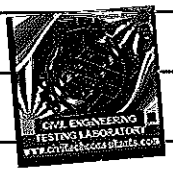
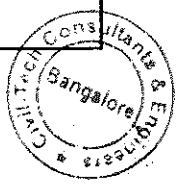
Job No.: CTCE/BBMP/W.No.13/GNR/BC/Shape.T/2015-16 : 15.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of Work	: Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	: EE/DD/WO.366/2014-15 Dated: 31.03.2015
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 15.03.2016





Result : Flakiness Index = **12.32%**

Elongation Index = **13.85%**

Result : Combined Flakiness & Elongation index **26.17%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.13/GNR/BC/Shape.T/2015-16 : 15.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of Work	: Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	: EE/DD/WO.366/2014-15 Dated: 31.03.2015
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 15.03.2016

Result : Flakiness Index = **11.06%**

Elongation Index = **13.15%**

Result : Combined Flakiness & Elongation index **24.21%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.13/GNR/BC/Stripping/2015-16 16.03.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of the Work	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Type of Mix	Bituminous Concrete
Date of Testing	16.03.2016

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Type of binder : 60/70

Percentage of binder used : 5.00% by wt.

Total weight of aggregate : 200 g

Total weight of binder : 10.00 g

Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.3	3.40	96.60
2	3.4		
3	3.5		

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Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.13/GNR/BC/Sp_Wa/2015-16 16.03.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of the Work	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Type of Mix	Bituminous Concrete
Date of Testing	16.03.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	1994	1995	1996	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1239	1238	1241	
4	Weight of saturated surface dry aggregate in air	W_3 g	2014	2015	2016	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	775	777	775	
6	Weight of oven dried aggregate	W_4 g	1998	1999	2000	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.578	2.573	2.581	2.577
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.632	2.627	2.635	2.631
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.80%	0.80%	0.80%	0.80%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No: CTCE/BBMP/W.No.13/GNR/BC/Bitumen/2015-16 16.03.2016

BITUMEN CONTENT DETERMINATION OF BITUMINOUS CONCRETE MIX

As per IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
NAME OF THE WORK	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	EE/DD/WO.366/2014-15 Dated: 31.03.2015
SAMPLE I/D	Roads in Ravindranagara, Ward No.13.
DATE OF TESTING	16.03.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	473.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	26.50
7. Bitumen content in %	5.20	5.30
8. Average	**5.25**	

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Job No: CTCE/BBMP/W.No.13/GNR/BC/Bitumen/2015-16 16.03.2016

BITUMEN CONTENT AFTER GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

As Per IS 2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
NAME OF THE WORK	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	EE/DD/WO.366/2014-15 Dated: 31.03.2015
SAMPLE I/D	Roads in Ravindranagara, Ward No.13.
DATE OF TESTING	16.03.2016

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	46.33	9.77	9.77	90.23	79-100
9.5	31.22	6.59	16.36	83.64	70-88
4.75	70.22	14.81	31.18	68.82	53-71
2.36	65.33	13.78	44.96	55.04	42-58
1.18	48.32	10.19	55.15	44.85	34-48
0.6	53.32	11.25	66.40	33.60	26-38
0.3	45.36	9.57	75.97	24.03	18-28
0.15	40.26	8.49	84.46	15.54	12-20
0.075	41.32	8.72	93.18	6.82	4-10

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	36.36	7.68	7.68	92.32	79-100
9.5	46.36	9.79	17.47	82.53	70-88
4.75	66.35	14.01	31.48	68.52	53-71
2.36	70.22	14.83	46.31	53.69	42-58
1.18	71.35	15.07	61.38	38.62	34-48
0.6	51.36	10.85	72.23	27.77	26-38
0.3	30.22	6.38	78.61	21.39	18-28
0.15	28.65	6.05	84.66	15.34	12-20
0.075	36.36	7.68	92.34	7.66	4-10

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Job No.: CTCE/BBMP/W.No.13/GNR/BC/Agg/2015-16 16.03.2016

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of theWork	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	16.03.2016

Total Weight of Sample: **5250** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	730	13.90	13.90	86.10	79 - 100	
9.5	510	9.71	23.62	76.38	70 - 88	
4.75	610	11.62	35.24	64.76	53 - 71	
2.36	525	10.00	45.24	54.76	42 - 58	
1.18	650	12.38	57.62	42.38	34 - 48	
0.600	535	10.19	67.81	32.19	26 - 38	
0.300	610	11.62	79.43	20.57	18 - 28	
0.150	365	6.95	86.38	13.62	12 - 20	
0.075	350	6.67	93.05	6.95	4 - 10	

Total Weight of Sample: **5350** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	640	11.96	11.96	88.04	79 - 100	
9.5	530	9.91	21.87	78.13	70 - 88	
4.75	640	11.96	33.83	66.17	53 - 71	
2.36	560	10.47	44.30	55.70	42 - 58	
1.18	630	11.78	56.07	43.93	34 - 48	
0.600	520	9.72	65.79	34.21	26 - 38	
0.300	550	10.28	76.07	23.93	18 - 28	
0.150	520	9.72	85.79	14.21	12 - 20	
0.075	420	7.85	93.64	6.36	4 - 10	

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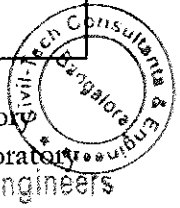

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Job No.: CTCE/BBMP/W.No.13/GNR /BC/Stability/2015-16 16.03.2016

TEST REPORT ON STABILITY OF MIX

Customer	:	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	:	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore - 560 021.
Name of Work	:	Improvements and Asphalting of Ravindranagara 1st Main and 2nd Main Roads in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
Reference	:	EE/DD/WO.366/2014-15 Dated: 31.03.2015
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	16.03.2016

The results of the tests conducted on the bituminous concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.50	9.65	9 Kn (min)
2	Marshal flow, mm	3.30	3.45	2 – 4
3	Percent air voids in Mineral Aggregate	13.40	13.75	13 – 15
4	Voids in Compacted Mix	4.50	4.90	3 – 6
5	Percent Voids filled with Bitumen	72.50	73.30	65 - 75
6	Density, g/cc	2.27	2.26	--

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